DOE/RL-98-20
Draft A

# Surveillance and Maintenance Plan for the 221-U Facility (U Plant)

United States
Department of Energy
Richland, Washington

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Draft A

# Surveillance and Maintenance Plan for the 221-U Facility (U Plant)

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ALARA | as low as reasonably achievable |
| BED | building emergency director |
| BHI | Bechtel Hanford, Inc. |
| CA | contamination area |
| CFR | *Code of Federal Regulations* |
| CWC | Central Waste Complex |
| DOE | U.S. Department of Energy |
| DOH | Washington State Department of Health |
| dp | differential pressure |
| Ecology | Washington State Department of Ecology |
| EPA | U.S. Environmental Protection Agency |
| ERC | Environmental Restoration Contractor |
| FSWM | Field Support Waste Management |
| FY | fiscal year |
| HCA | high contamination area |
| HEPA | high efficiency particulate air |
| HRA | high radiation area |
| kg | kilogram |
| kV | kilovolt |
| L | left |
| LDR | land disposal restriction |
| NDA | nondestructive assay |
| PCB | polychlorinated biphenyl |
| PHMC | Project Hanford Management Contractor |
| PUREX | plutonium uranium |
| R | right |
| RBA | radiological buffer area |
| RCRA | *Resource Conservation and Recovery Act of 1976* |
| RCT | Radiological Control technician |
| REDOX | reduction oxidation |
| RMA | radiological material area |
| RMS | remote monitoring system |
| RWP | radiation work permit |

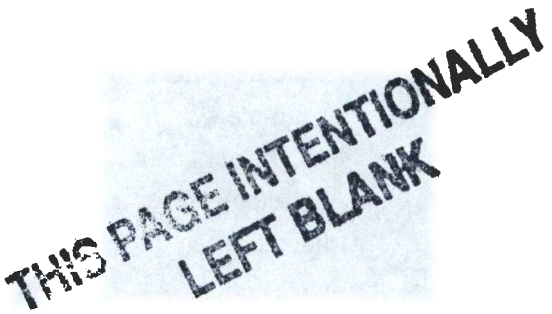
## ACRONYMS AND ABBREVIATIONS (cont.)

| | |
|---|---|
| SAA | satellite accumulation area |
| S&M | surveillance and maintenance |
| SSWMI | site-specific waste management instructions |
| TBP | tributyl phosphate |
| Tri-Party Agreement | *Hanford Federal Facility Agreement and Consent Order* |
| TRU | transuranic |
| TSD | treatment, storage, and disposal |
| UNH | uranyl nitrate hexahydrate |
| $UO_3$ | uranium trioxide |
| V | volt |
| WAC | *Washington Administrative Code* |

## Metric Conversion Chart

The following conversion chart is provided to the reader as a tool to aid in conversion.

| Into Metric Units | | | Out of Metric Units | | |
|---|---|---|---|---|---|
| *If You Know* | *Multiply By* | *To Get* | *If You Know* | *Multiply By* | *To Get* |
| **Length** | | | **Length** | | |
| inches | 25.4 | Millimeters | millimeters | 0.039 | inches |
| inches | 2.54 | Centimeters | centimeters | 0.394 | inches |
| feet | 0.305 | meters | meters | 3.281 | feet |
| yards | 0.914 | meters | meters | 1.094 | yards |
| miles | 1.609 | kilometers | kilometers | 0.621 | miles |
| **Area** | | | **Area** | | |
| sq. inches | 6.452 | sq. centimeters | sq. centimeters | 0.155 | sq. inches |
| sq. feet | 0.093 | sq. meters | sq. meters | 10.76 | sq. feet |
| sq. yards | 0.0836 | sq. meters | sq. meters | 1.196 | sq. yards |
| sq. miles | 2.6 | sq. kilometers | sq. kilometers | 0.4 | sq. miles |
| acres | 0.405 | hectares | hectares | 2.47 | acres |
| **Mass (weight)** | | | **Mass (weight)** | | |
| Ounces | 28.35 | grams | grams | 0.035 | ounces |
| Pounds | 0.454 | kilograms | kilograms | 2.205 | pounds |
| Ton | 0.907 | metric ton | metric ton | 1.102 | ton |
| **Volume** | | | **Volume** | | |
| teaspoons | 5 | milliliters | milliliters | 0.033 | fluid ounces |
| tablespoons | 15 | milliliters | | | |
| fluid ounces | 30 | milliliters | | | |
| cups | 0.24 | liters | | | |
| pints | 0.47 | liters | liters | 2.1 | pints |
| quarts | 0.95 | liters | liters | 1.057 | quarts |
| gallons | 3.8 | liters | liters | 0.264 | gallons |
| cubic feet | 0.028 | cubic meters | cubic meters | 35.315 | cubic feet |
| cubic yards | 0.765 | cubic meters | cubic meters | 1.308 | cubic yards |
| **Temperature** | | | **Temperature** | | |
| Fahrenheit | subtract 32, then multiply by 5/9 | Celsius | Celsius | Multiply by 9/5, then add 32 | Fahrenheit |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# 1.0 INTRODUCTION

This document provides a plan for implementing surveillance and maintenance (S&M) activities to ensure the 221-U (U Plant) Facility is maintained in a safe, environmentally secure, and cost-effective manner until subsequent closure during the final disposition phase of decommissioning. This plan has been prepared in accordance with the guidelines provided in the U.S. Department of Energy (DOE) Office of Environmental Management (EM) Decommissioning Resource Manual (DOE 1995) and Section 8.6 of TPA change form P-08-97-01 to the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology, et al. 1996). Specific objectives of the S&M program are as follows:

- To ensure adequate confinement of hazardous substances.
- To provide physical safety and security controls.
- To maintain the facilities in a manner that will minimize potential hazards to the public and workers.
- To provide adequate frequency of inspections to identify potential hazards.
- To maintain selected systems or equipment that will be essential for decommissioning activities in a shutdown but standby or operational mode, if economically justified.
- To provide a mechanism for the identification and compliance with applicable environmental, safety and health, and safeguard and security requirements.

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# 2.0 FACILITY DESCRIPTION

This chapter provides a description of the 221-U Facility including ancillary facilities. In addition to supplying an overall understanding of the facility, the facility description section identifies S&M activities.

## 2.1 FACILITY HISTORY

U Plant was constructed in 1944 as one of three original chemical separation plants (B Plant, U Plant, and T Plant) to support plutonium production during World War II. The plants were built to extract plutonium from fuel elements that were irradiated in the Hanford production reactors. Each plant was equipped to use the bismuth phosphate fuels-separation process. The 221-U Building was never used for that purpose because T Plant and B Plant were sufficient to meet plutonium production needs. The 221-U Building was used for training B Plant and T Plant operators until 1952 when the building was converted to the tributyl phosphate (TBP) process to recover uranium from the bismuth phosphate process waste.

The bismuth phosphate process wastes were stored in tank farms in the 200 East and West Areas. From 1952 to 1958, waste slurry was pumped to the 221-U Building from single-shell tanks by existing underground lines. The waste sludge was dissolved in nitric acid and the uranium extracted using the TBP process in a kerosene (paraffin hydrocarbon) diluent to extract the uranium from the aqueous phase in counter current extraction columns. This process left fission products, sulfate, nitrate, and phosphate ions in aqueous solution while the uranium was partitioned into the organic phase. The uranium was then stripped from the organic solvent with nitric acid. The resulting uranyl nitrate hexahydrate (UNH) was converted to uranium trioxide ($UO_3$) by calcination at high temperatures in the 224-U/UA Buildings.

The same underground lines used to pump bismuth phosphate process wastes from the tank farms to the 221-U Building were used to pump 221-U Building TBP process waste, neutralized with sodium hydroxide, to disposal facilities (ultimately cribs) near B Plant.

The 221-U Building was placed on standby in 1958 and has not been used for uranium recovery since that date. From 1958 to 1964, U Plant was used to receive, decontaminate, and maintain contaminated equipment from other Hanford processing facilities (B Plant, Plutonium Uranium Extraction [PUREX] Facility, T Plant, and Reduction Oxidation [REDOX] Facility). It is anticipated that this equipment will remain in the 221-U canyon until the ultimate disposition of the 221-U Building.

No written record of U Plant deactivation exists; therefore, the quantity, form, and distribution of the hazardous material are uncertain. This uncertainty is increased because contaminants have been introduced by the storage of radiochemical process equipment in the process cells and on

the canyon deck of the 221-U Building. The predominance of hazardous material is assumed to be a residue affixed to the surfaces of the equipment and to the interior of process vessels and piping.

U Plant is located in the 200 West Area at the northwest corner of 16th Street and Beloit Avenue, adjacent to the deactivated $UO_3$ Plant, as shown in Figure 2-1. The U Plant buildings and structures covered by this document are as follows:

- 221-U Building
- 271-U Building (office structure)
- 276-U Solvent Handling Facility
- 211-U and 211-UA Tank Farms
- 291-U ventilation system
- 292-U Stack Monitoring Station.

A plan view of U Plant, its associated buildings, and other nearby structures is shown in Figure 2-1.

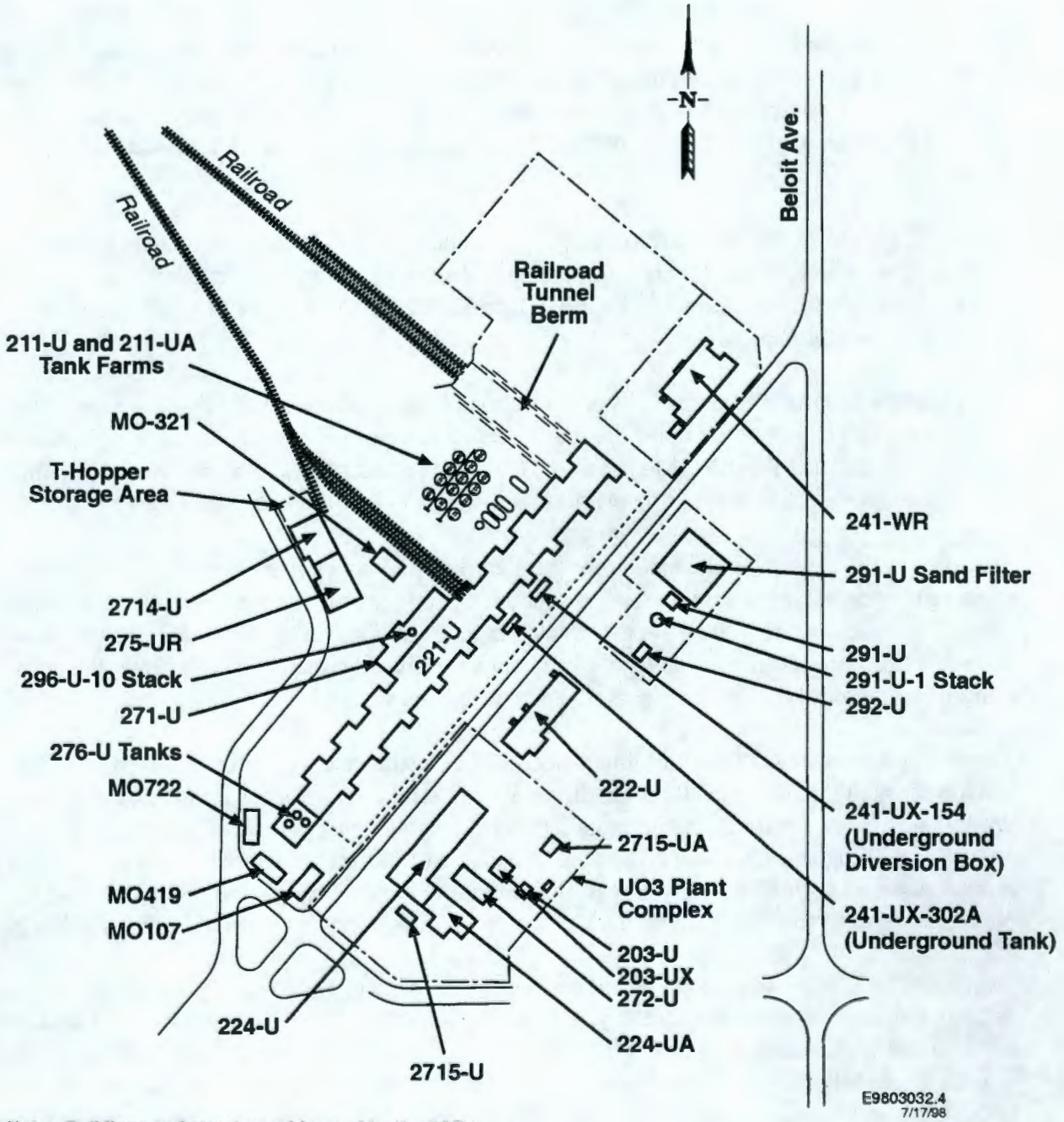
## 2.2 U PLANT COMPLEX

### 2.2.1 211-U and 211-UA Tank Farms

The 211-U and 211-UA Tank Farms were a part of the chemical processing facility that used chemical solutions to extract uranium from Hanford Site waste streams. All of the tanks are above grade and were used to provide storage of process feed chemicals. Based upon process knowledge, the original facility deactivation consisted of complete removal of bulk materials, flushing of systems, and installing blind flanges on piping. However, residual materials may remain as heels in the tanks and piping systems.

In support of the $UO_3$ mission up to 1994, the 211-UA Tank Farm received and stored nitric acid, sulfuric acid, sodium hydroxide, and other process feed chemicals. The nitric acid was contained in five 100,000-gal stainless steel tanks: 302-U, 303-U, 306-U, 307-U, and 308-U. The sodium hydroxide was received and stored in four 100,000-gal stainless steel tanks: 321-U, 322-U, 323-U, and 324-U. The 211-U Tank Farm received and stored the sulfuric acid; the tank farm consists of three small horizontal and one small vertical tanks. The tank farms are serviced by a railroad that was also used to ship nitric acid to the PUREX Plant in the 200 East Area. Also associated with the 211-UA Tank Farm is pump pit P-307, which was used to transfer liquids between tanks, process vessels, and railcars.

**Figure 2-1. U Plant Complex and Nearby**




*** Note: Buildings and structure addressed by the SAR include 221-U, 271-U, 276-U, 211-U, 211-UA, 291-U, 292-U, 275-UR, MO-321, and 241-WR**

Ref: Dwg. H-2-44511
Sh. 67, 68, 76

### 2.2.2 221-U Building (Canyon and Galleries)

The 221-U Building was constructed from 1944 to 1945 to be used for fuel separation processes. However, the facility was never used for that purpose. Instead it was extensively modified between 1950 to 1952 to recover uranium from high-level wastes stored in underground tanks. The 221-U canyon is currently used to store used process equipment from other Hanford Site facilities and to provide confinement for the hazardous substances located within the facility. Some cell block covers have been removed with the cells open to the canyon. Figures 2-2 and 2-3 provide section and plan views of the 221-U Building. Structural dimensions are given in Figure 2-2.

The 221-U Building is constructed of reinforced concrete. 221-U contains a canyon, crane cabway, and three galleries (operating, pipe, and electrical). A layout of the building from the operating gallery level is shown in Figure 2-3, and a section view of the building is shown in Figure 2-2 (Section 2.0).

The canyon contains 40 process cells and a railroad tunnel entrance/exit. Twenty numbered 40-ft sections run the length of the building. Each section has two process cells; one is designated as the right (R) cell and the other as the left (L) cell. In the past, the cells were numbered 1 through 40. The canyon deck is approximately 40 ft below a 3- to 4-ft-thick concrete roof.

Shielding walls separating the cells from the electrical and pipe galleries are made of 9-ft-thick reinforced concrete. The canyon deck is separated from the operating gallery by a 7-ft-thick reinforced concrete shield wall. A 6-ft-thick concrete wall extending 9 ft above the crane cabway floor level protects the crane cabway. Six-ft-thick reinforced concrete blocks cover the cells. To eliminate a direct radiation shine path, the cover block is stepped.

The railroad tunnel enters the building at section 2. Outside access is provided to the railroad canyon through a 16-ft by 22-ft motor-driven rolling steel door. Entries into the canyon are through an airlock from the operating gallery (also located in section 2). There are 10 exterior stairwells leading from the canyon deck to outside: two of these stairwells (sections 1 and 9) remain functional for emergency egress; the remaining 8 have been sealed or locked. An emergency egress from the canyon deck to the operating gallery is also provided at section 20.

Except for cells 1L, 1R, 2L, and 5R, all cells are 18 ft long, 13 ft wide, and 26 ft deep. A 7-ft-thick reinforced-concrete wall separates each pair of cells. The floor of each cell slopes to a drain in one corner so that liquids, which enter the cell, will drain through a radioactive drain line to tank 5-6 in cell 5R (Cell 10) (which is deeper than the other cells). Process lines are encased in concrete and terminate in a row of connector flanges on the cell wall 9 ft below canyon deck level. Some process lines go directly through the wall to the adjacent cell in the same section.

**Figure 2-2. Typical Section View of 221-U Building.**

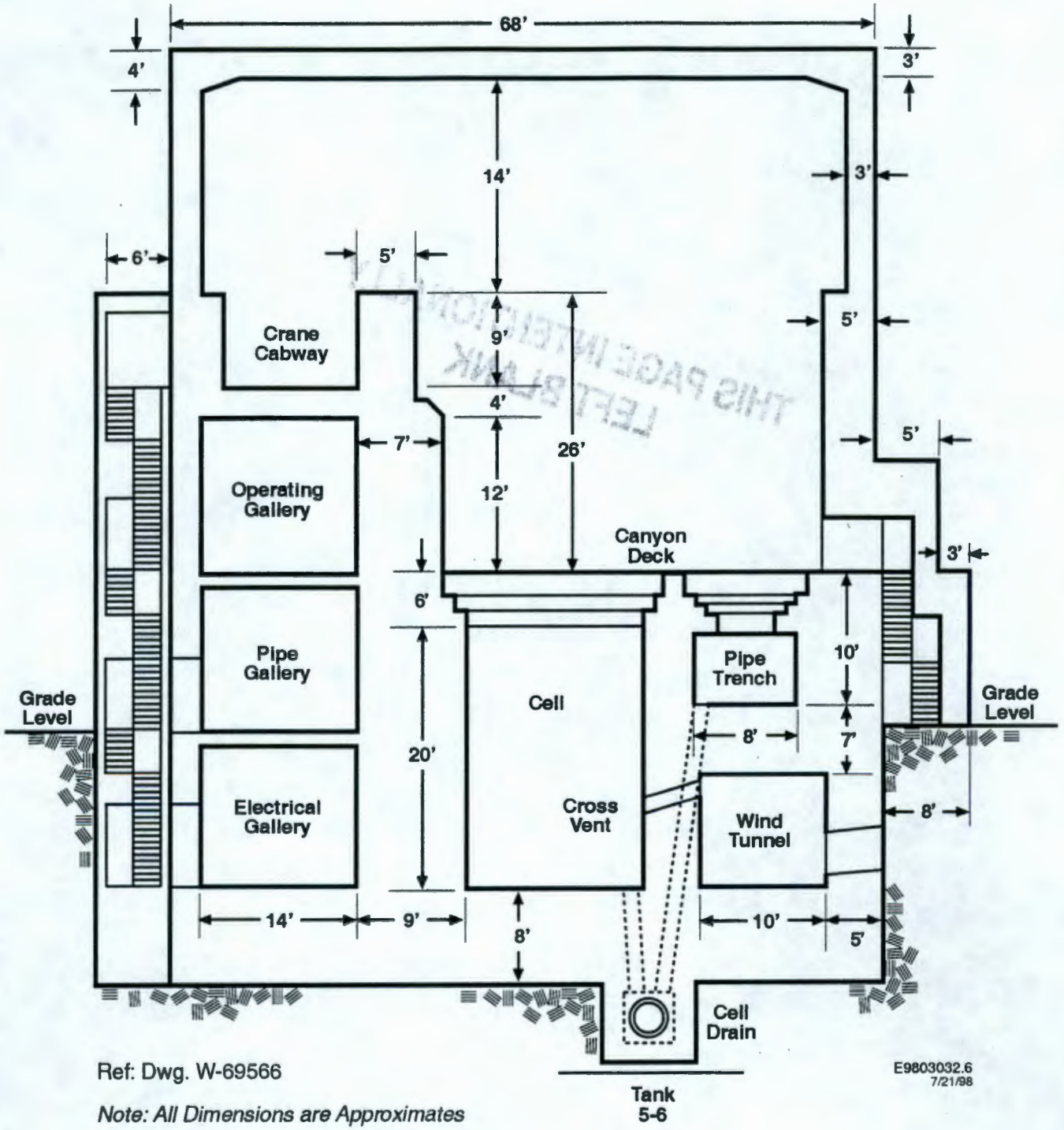


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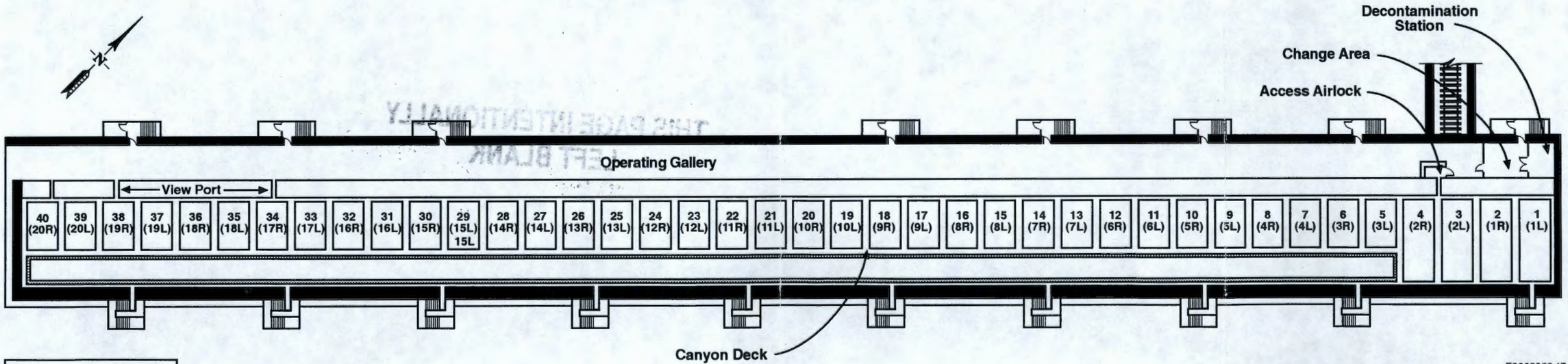
**Figure 2-4. Typical Plan View of 221-U Building Cell Contents and Cover Block.**

# 221-U Building Cell Numbering Legend

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**LEGEND**

- Tank
- Tank
- Tank
- Enclosed Tank
- Pump

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There are no direct through-the-wall connections between cell sections, because each section is separated by an expansion joint. All intra-cell liquid transfers were made through an 8-ft-wide by 10-ft 6-in. pipe trench. The floor of the trench is sloped to ensure proper drainage. A series of reinforced-concrete cover blocks, stepped on the side to eliminate a path for radiation shine, cover the pipe trench.

A 10-ft 6-in. square concrete exhaust air tunnel running the length of the canyon provides exhaust for the canyon cells. The tunnel exits the canyon at section 3, 22 ft below deck level, and narrows to a 4-ft by 7-ft duct. The underground duct then runs to the bottom of sand filter that discharges to the 291-U stack exhaust system.

The electrical gallery is 800 ft long by 14 ft wide. The electrical gallery contains most of the drain system lines converging from the pipe and operating galleries. The drain lines vary in size from 2 to 4 in. and are constructed of stainless steel, black iron, and polyvinyl chloride piping.

The pipe gallery has the same dimensions as the electrical gallery, and is located directly above, the electrical gallery. The sanitary water supply to 271-U Building runs through part of the piping gallery. The canyon wall supports existing process and chemical piping in the piping gallery. This piping is isolated and some was flushed prior to deactivation. The piping, varying in diameter from 1 to 8 in., runs the length of the gallery. The process and chemical piping was jumpered from the pipe gallery to penetrations through the canyon wall. The jumpers have all been removed, and the penetrations have been capped.

The operating gallery has the same dimensions as the pipe gallery, and is located directly above, the pipe gallery. This gallery was the control center for remote operation of the canyon equipment. Various control boards are located throughout the gallery; however, none are in use. Control panels have been removed and the jumpers from the pipe gallery removed and capped at the operating gallery floor level.

There are 8 exterior stairwells on the front of the 221-U Building. These stairwells contain deactivated ventilation equipment and deactivated sanitary bathroom facilities. Some of the stairwells are blocked off and no longer in use. These stairwells provide for air infiltration into the galleries and crane cabway.

The inventories for specific radionuclides and other hazardous substances that may be present in the 221-U Building are discussed in Section 3.0.

### 2.2.3 271-U Office Building

The 271-U Building was constructed between 1944 and 1945 as a support facility for U Plant operations. The 271-U Building is a basement and three-story office and storage structure

directly attached to the northwest side of the 221-U Building. This building has been upgraded and renovated and now provides office space for approximately 60 Surveillance/Maintenance and Transition Project personnel supporting all 200 Area retired facilities, including U Plant.

The 271-U Building has a reinforced concrete foundation, floors, and pillars; pumice block walls; and a built-up asphalt and gravel roof. Outside dimensions are 160 ft by 48 ft by 67 ft 10 inches (10 ft 6 in. below grade) with an area of 30,720 $ft^2$.

The 271-U Building has numerous support features. Routine access to the 221-U Building galleries is made through doors at sections 11 and 13 on the basement, first, or second floors. The 271-U basement contains ventilation supply equipment, offices, and shops. The first and second floors contain offices and storage. The third floor is not in use and contains a deactivated chemical make-up facility and a vault intended, but never used, to store plutonium. On the 271-U roof is the 296-U-10 stack and exhaust fan, both deactivated, that was dedicated to the third-floor chemical make-up facility.

### 2.2.4 276-U Solvent Handling Facility

The 276-U Solvent Handling Facility is located adjacent to the southwest end of 221-U Building and was used for storage of clean, uncontaminated TBP and hydrocarbon diluent for makeup and treatment of the organic solutions used in the 221-U Building. The 276-U Building is a 66-ft by 54-ft concrete slab approximately 10 ft below grade with concrete walls extending approximately 5 ft above grade.

Much of the asbestos has been removed from the 276-U area, but small amounts may still exist. The area is posted as a surface contamination area. Estimates of radioactive inventory associated with 276-U are showed in Section 3.0.

### 2.2.5 291-U Exhaust Fan Facility

The 291-U Exhaust Fan Facility, constructed from 1944 to 1945, contains a sand filter, two electrical exhaust fans (The steam turbine has been taken out of service and the fan housing and turbine removed.), a control building, concrete ducts, and a stack, and provides ventilation for the 221-U Building. The exhaust system maintains the radiologically contaminated areas within 221-U Building under negative pressure with respect to the atmosphere.

### 2.2.6 292-U Stack Monitoring Station

The 292-U Stack Monitoring Station provides housing for the exhaust gas monitoring system. The building has block walls, a reinforced concrete foundation and floor, and a roof made of concrete sections with built-up asphalt and gravel. It is 21 ft by 16 ft, 19 ft 7 in. high, for a total area of 336 $ft^2$.

The building is located southwest of the 291-U-1 stack and has no services, active equipment, or processes.

## 2.3 SURVEILLANCE AND MAINTENANCE

Project activities for U Plant include routine S&M and nonroutine activities. Routine activities provide S&M to ensure that structural and confinement integrity is maintained. Surveillance requirements are defined in BHI-FS-01, *Field Support Administration*, Section 2, Job Control, and Section 3, Surveillance and Maintenance. The Bechtel Hanford, Inc. (BHI) Field Support group provides routine maintenance. Maintenance activities are implemented in accordance with BHI-01044, *ERC Maintenance Implementation Plan for Nuclear Facilities* (BHI 1997).

Programmatic controls, described further in Sections 3.0 through 7.0, are in place to ensure that S&M activities are within the authorization basis, and protect the worker, public, and environment.

Nonroutine activities include major responses to undesirable observations. Such responses may encompass facility structural repairs, facility/equipment modifications, or upgrades.

The U Plant process has been deactivated and is expected to remain in the S&M program until the year 2011 or later. This section defines S&M activities to be performed until final disposition.

### 2.3.1 Surveillance

The following surveillance items are conducted on a quarterly basis for the 221-U galleries and canyon deck.

- Inspection of barriers and postings is conducted as part of the facility's routine surveillance. Barriers and postings are utilized to prevent unwarranted access to hazardous areas and to inform personnel of conditions that exist at the U Plant. Examples include locks and tags, door locks, fencing, confined space postings, and radiological area postings.

- Inspections to identify animal intrusion.

- Electrical hazard identification.

- Visual inspection of existing containers and identification of unlabeled containers within U Plant. Contents of any unlabeled containers are identified and labeled. Containers are removed and transported to a permitted storage facility for treatment, storage, and/or disposal

(TSD). Periodic container inspections are performed to guard against container deterioration or signs of leakage. If a deteriorating or leaking container is found, the container is repackaged and removed to an appropriate disposal facility.

- Inspection for indications of spills of hazardous substances. If a spill is discovered, the affected area will be isolated to prevent personnel exposure, corrective measures will be determined, and the spilled material will be packaged and removed to an appropriate disposal facility.

Other surveillances are conducted as follows:

- Daily monitoring of the 221-U Remote Monitoring System in accordance with BHI-FS-04, *Field Support Operating Procedures*, Procedure No. S-200-004, "Operation of the REDOX and U Plant Remote Monitoring System," Section 10.1, 'Shift Routines.'

- Engineering structural inspection, conducted on the 221-U Facility including interior, exterior, and roof, is conducted annually.

- The nondestructive assay (NDA), waste characterization, and sampling may be performed in U Plant. The activities will be performed in accordance with established programs and procedures and shall comply with special controls established in the authorization basis. These activities may be performed to better establish radioactive material inventory and location, determine quantity and makeup of newly discovered materials, or to support planning for eventual disposition alternatives.

- Asbestos-containing materials or presumed asbestos-containing materials are inspected prior to commencement of renovation or demolition activity. If damaged friable asbestos is present, the area is posted as a regulated area. Depending on the scope and severity of he damage, repair, encapsulation, or removal will be undertaken through the asbestos abatement program and appropriate radiological and industrial hygiene requirements.

### 2.3.2 Maintenance

There are two types of maintenance: (1) preventive and (2) corrective. Preventive maintenance is conducted on a pre-scheduled basis to ensure proper functioning of operational equipment. Corrective maintenance is performed after equipment has malfunctioned or structural repair due to degradation or to upgrade facilities and/or equipment.

Preventive maintenance schedules are established based on manufacture recommendations, judgement based on performance history, and other field experience. A periodic review of the maintenance records is used to validate maintenance frequency.

Preventive maintenance includes routine calibration and testing conducted as appropriate on equipment such as level monitoring systems, fire extinguishers, batteries, ventilation systems, and electrical components. Elements and schedules for these activities are included in procedures and task instructions.

Corrective maintenance includes the following:

- Structural components necessary to ensure confinement will be repaired or upgraded to maintain control of hazardous substances. Corrective action will be performed in accordance with established programs and procedures. Changes will be evaluated on a case-by-case basis to determine if these are within the bounds of the authorization basis.

- Repair of confinement system is performed to confine hazardous substances within U Plant. Upgrades or physical changes to these systems may be undertaken if the changes provide equivalent or improved confinement. Changes will be evaluated on a case-by-case basis to determine if these are within the bounds of the authorization basis. The repair or upgrade to a confinement system will be evaluated against the existing design.

Other maintenance may include removal of nonprocess equipment or decon activities may be performed in U Plant in support of reducing the risks from known hazards (e.g., removing abandoned conduits, removing unused but energized electrical equipment) and redeploying obsolete equipment as spare and replacement equipment (e.g., switchgear and motor control centers, etc.). These activities will be performed in accordance with established programs and procedures.

## 2.4 OPERATIONS

The following sections describe the major structures and operation of active systems.

### 2.4.1 221-U Building Ventilation

The 221-U ventilation system has no active supply fans. Air supply is provided through a number of air infiltration pathways such as gaps around exterior doors, louvers in the front stairwells, doors between front stairwells and galleries, doors between the 271-U Building and the galleries, the railroad tunnel door, structural expansion joints, and other exterior penetrations.

A minor amount of supply tempered air is directly provided via the active 271-U Building supply fan through ductwork to the 221-U electrical gallery. In general, supply and infiltration air flows up through the galleries and front stairwells to the crane cab area and down to the canyon deck, through the cell and pipe trench cover blocks, and into the air tunnel. The air tunnel is exhausted through the 291-U sand filter prior to discharge up the 291-U-1 stack. The ventilation system for the 221-U/271-U buildings is shown in Figure 2-4.

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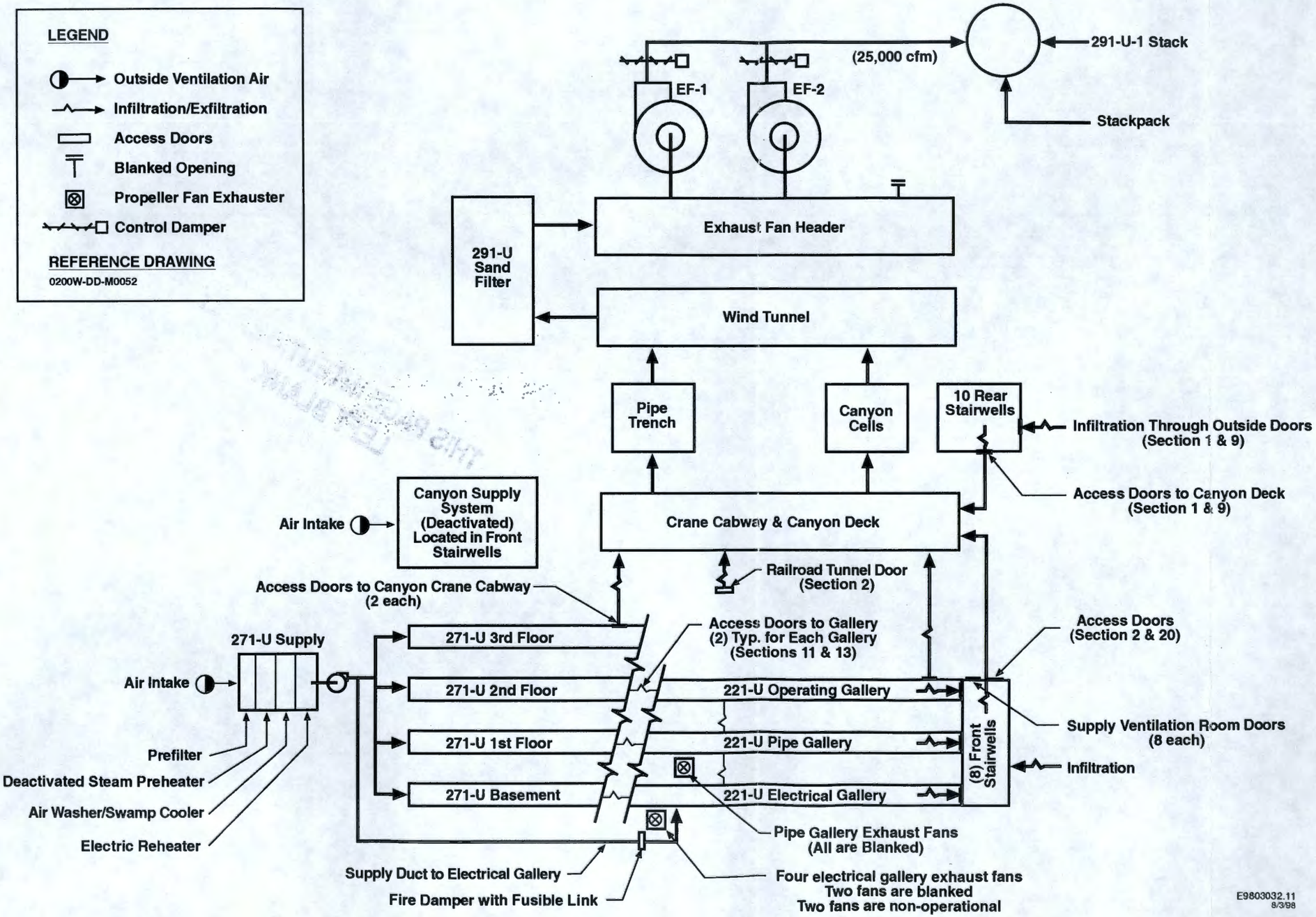


Figure 2-4. 221-U and 271-U Buildings Ventilation Flow.

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The 291-U exhaust flowpath maintains the canyon and galleries of 221-U at a negative pressure with respect to atmosphere. One of two functional exhaust fans normally operates to maintain airflow from areas of lesser to greater contamination, thereby controlling the spread of contamination. The 291-U sand filter filters exhaust air prior to discharge to the 291-U-1 stack. The 291-U-1 stack is registered under FF-01 with the Washington State Department of Health (DOH) and with the U.S. Environmental Protection Agency (EPA) as potential radionuclide emitter and as a category 2 minor stack under 40 *Code of Federal Regulations* (CFR) 61, Subpart F, and *Washington Administration Code* (WAC) 246-247 (DOE-RL 1995). The stack is sampled one week per quarter as required in the permit.

### 2.4.2 Loss of Power

A single electric supply is provided to both the supply and exhaust fans. Backup power is not provided. On a loss of power, both the supply fan and exhaust fans will stop/trip, resulting in a loss of ventilation to the 271-U and 221-U Buildings. The inlet and outlet dampers of the operating exhaust fan "fail as is," and natural convection draft from the 291-U-1 stack maintains a slight negative differential pressure (dp) in the canyon. On loss of ventilation, there is no driving force to spread contaminants from 221-U to 271-U. Personnel entries to the galleries require special precautions, but evacuation of 271-U is not required.

## 2.5 ELECTRICAL POWER, LIGHTING, AND COMMUNICATIONS

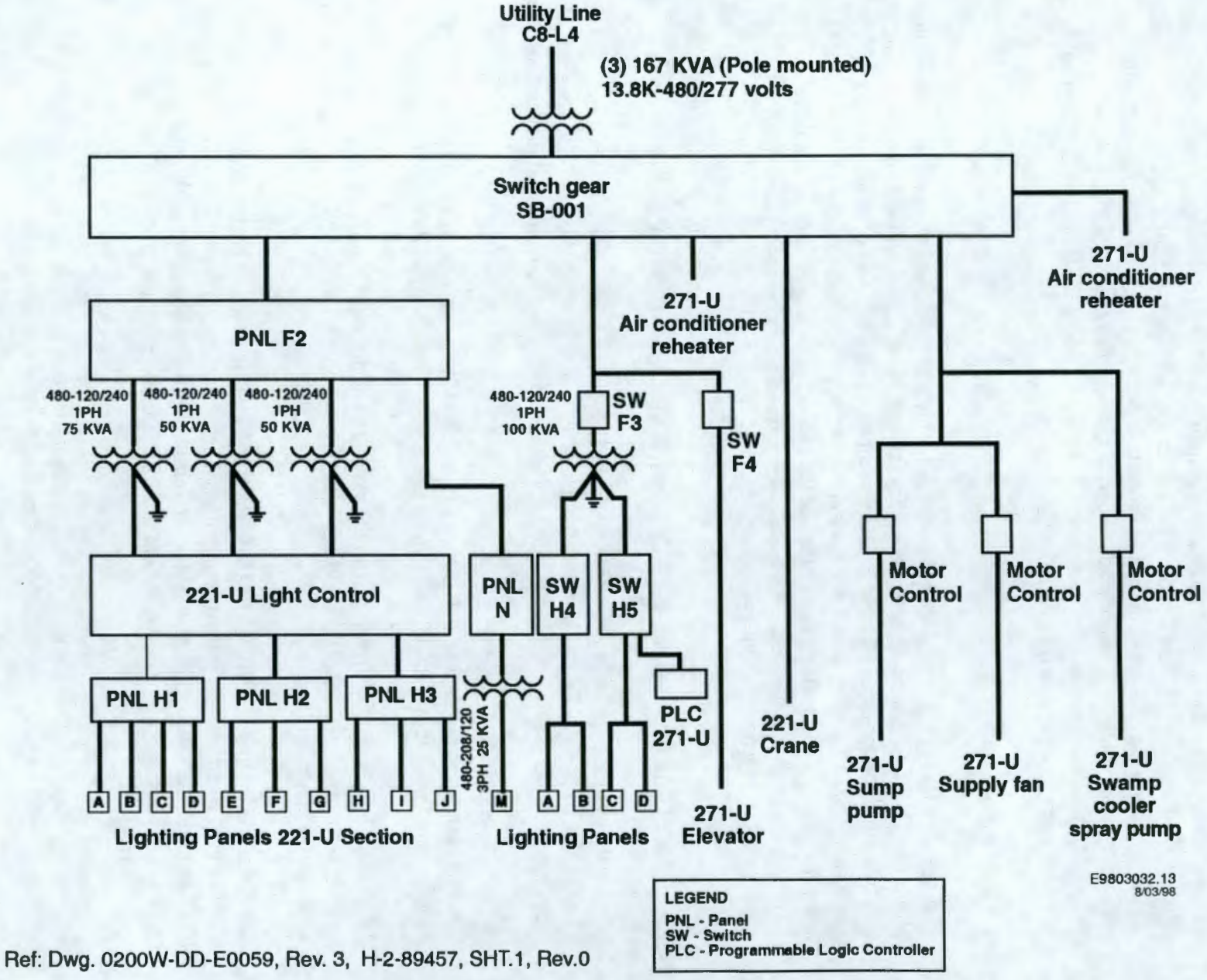
Electrical power is supplied to 271-U by a single 13.8-kilovolt (kV) line that supplies 13.8kV/480 volt (V)/277V transformers that carry all loads. A simplified one-line diagram of the supply system and major loads is provided in Figure 2-5. Backup power capability to these loads is not provided.

Electrical power is supplied to 291-U by a single 2.4-kV line that supplies 2.4kV/480V transformers that carry all loads. Backup power capability to these loads is not provided.

All U Plant buildings have lighting with the exception of the 292-U Building. Surveillance lighting is installed in the 221-U Building; for safety purposes, all facility personnel and visitors must carry a spare light source.

The Remote Monitoring System (RMS) located in 271-U is powered by the normal power supplies at U Plant and has a short-term battery backup supply. If power is lost to U Plant, the RMS at 271-U has enough battery reserve to initiate alarms and autodial notifications during off-hours. If normal power is lost only at the REDOX Complex, the RMS at 271-U will remain functional.

There are several different forms of communications used in U Plant, including an active telephone system, crash system telephones, radios, cellular telephones, and pagers.




Ref: Dwg. 0200W-DD-E0059, Rev. 3, H-2-89457, SHT.1, Rev.0

**Figure 2-5. U Plant Electrical One-Line Diagram.**

## 2.6 WATER SYSTEMS

An existing 12-in. raw water main and a 12-in. sanitary water main are located on the west side of U Plant. From these mains, a 10-in. raw water line and a 10-in. sanitary line are extended into U Plant and terminate at the south end of 221-U. A sanitary water line runs through the 221-U piping gallery and into 271-U Building. There is one hydrant supplied by the sanitary water system and one hydrant supplied by the raw water system that are used for manual fire fighting. The raw water line into the building has been blanked exterior to the 221-U Building. The water lines are shown in Figure 2-6.

## 2.7 EQUIPMENT AND FLOOR DRAINS

Both 221-U and 271-U Buildings have active drain systems. These systems are shown in Figure 2-7 and are further described in section 3.8.

### 2.7.1 221-U Building

All process operations at 221-U have been shut down for many years, and accumulations of liquids in equipment and floor drains is not subject to significant change. The electrical gallery of 221-U does not have an active drain system. Liquid that accumulates in the electrical gallery is allowed to evaporate; a sump pump may be used. The operating and pipe gallery levels have drains that lead to either sanitary or chemical sewer systems. The drains to the sanitary sewers have been plugged. The drains leading to the chemical sewer (which discharges to the 207-U retention basin) remain open and active. The 207-U is shared by 271-U/221-U and the 224-U/UA facilities for evaporation of accumulated liquids. The 207-U has a liner installed to mitigate liquid losses to the original basin structure.

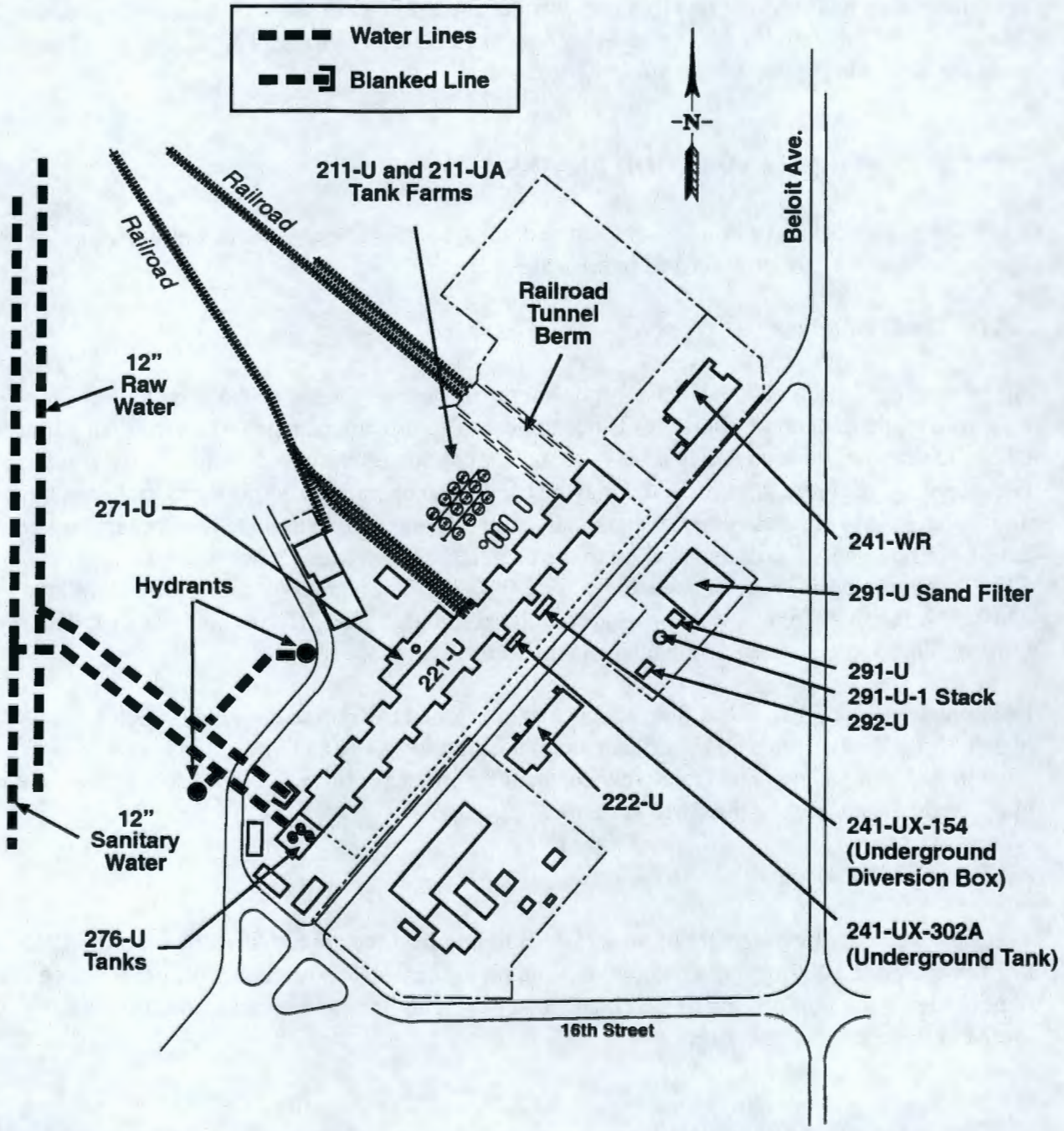
Each process cell of 221-U has floor drains that are sloped to drain to tank 5-6, which is located in cell 5R (cell 10). Since no significant amount of liquids is present or used in the canyon, the level in tank 5-6 has remained relatively constant for a number of years. The level of this tank is monitored periodically by the RMS system.

### 2.7.2 271-U Building

There is a sump in the basement of the 271-U Building near the supply fan air conditioning fluid from evaporative cooling is drained into a sump pit in the 271-U basement where it is stored until liquid effluent are pumped out to the chemical sewer. The first- and second-floor drains are also routed to the chemical sewer line.

If water were to accumulate in the 291-U-1 stack, it would drain to the 241-UX diversion box, which then leads to the 241-UX-302 catch tank.

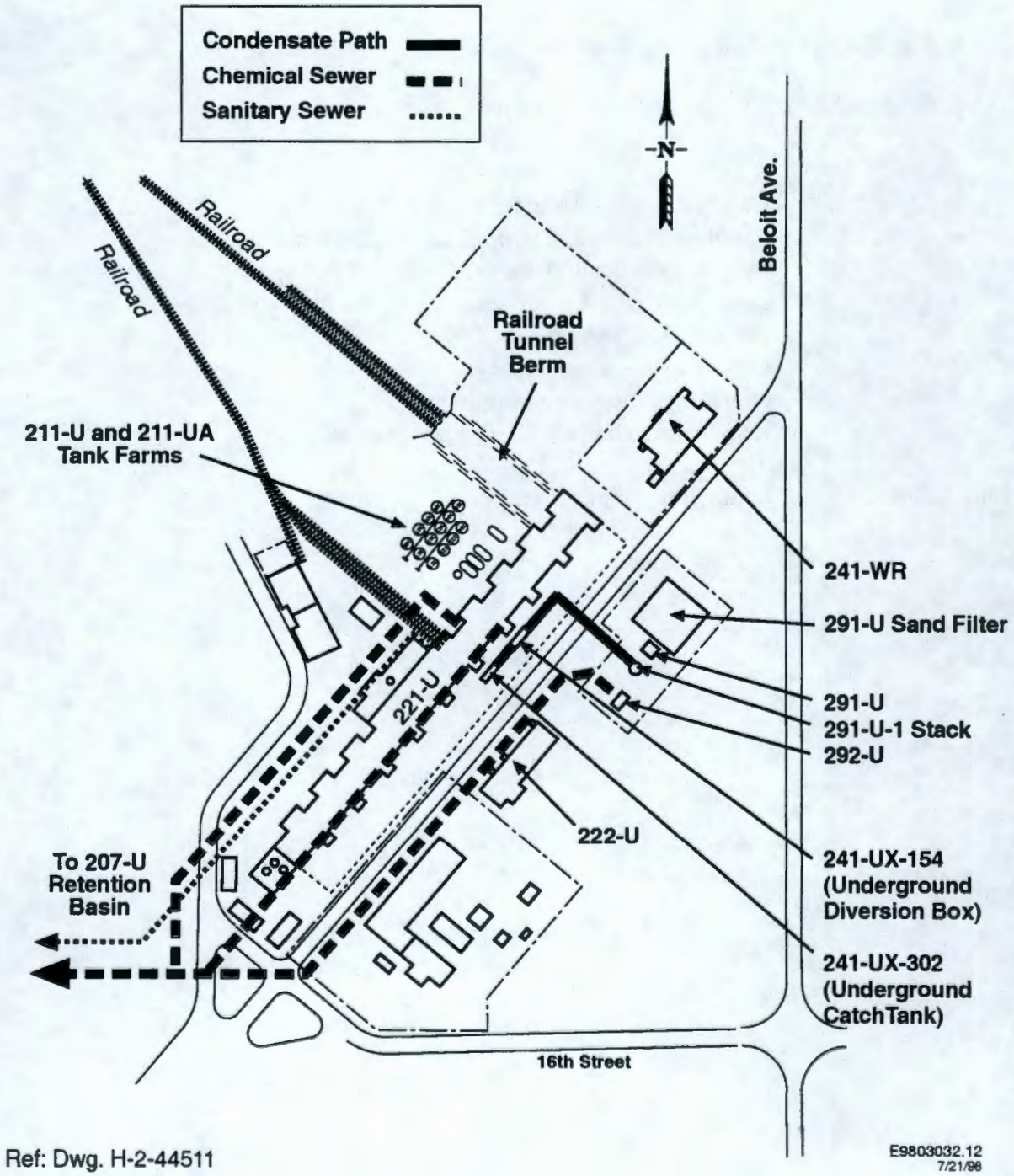
**Figure 2-6. Active U Plant Water Lines.**




Ref: Dwg. H-2-44511 (Sheets 67, 68, 76)
H-2-50657

E9803032.15
7/20/98

**Figure 2-7. Active U Plant Drain Paths.**



## 2.8 CONTROL AND INSTRUMENTATION

A remote monitoring system is in place at the 271-U Facility to monitor various conditions at U Plant. The following are capabilities of the RMS.

271-U Supply Fan operating indication

| | |
|---|---|
| 291-U Exhaust | EF-1 and EF-2 |
| | remote start/stop/indication<br>remote damper position<br>remote vibration and temperature indication/alarm<br>remote dp indication/alarm for:<br>sand filter,<br>canyon to atmosphere,<br>canyon to operating gallery,<br>operating gallery to atmosphere,<br>remote indication of 291-U stack pack alarms |
| Tank 5/6 | remote level indication |
| Misc | U Plant trouble |

# 3.0 WASTE MANAGEMENT AND ENVIRONMENTAL COMPLIANCE REQUIREMENTS

Waste management requirements during S&M activities at U Plant may apply to management and disposal of small quantities of various types of materials generated from routine S&M activities. Routine activities include handling and disposition of waste generated from small-scale cleanup, spill cleanup, and housekeeping activities. There are no routine waste streams resulting from U Plant S&M activities.

Environmental protection requirements directly related to the S&M scope of work include inspections of differential air pressures for facility high efficiency particulate air (HEPA) filtration systems, ensuring compliance with air emissions regulations, and reporting of routine and nonroutine releases and conditions. Requirements appropriate for monitoring and control of radiological conditions in the U Plant Facility are presented in section 4.0, and are not addressed here.

## 3.1 WASTE MANAGEMENT STANDARDS

U Plant is a deactivated surplus facility with the majority of hazardous materials consisting of fairly adherent films and residues in deactivated equipment and systems. Various NDA and sampling techniques are used for identification and characterization of potentially hazardous materials encountered or anticipated during S&M activities. Materials and determination methods are developed on a job-specific basis. The S&M activities involve handling and disposition of small quantities of waste generated from small-scale cleanup, spill cleanup, and housekeeping activities. The potential regulated wastes involve the following:

- Heavy metals (e.g., lead, mercury)
- Light bulbs
- Radioactively-contaminated rain water
- Contaminated oils
- Fuels
- Batteries
- Miscellaneous chemicals
- Miscellaneous liquids
- Asbestos
- Polychlorinated biphenyls (PCB)

Waste management requirements for hazardous (Washington State dangerous) and radioactive mixed wastes are primarily derived from WAC 173-303 and 40 CFR 260 through 268. Since there are no *Resource Conservation and Recovery Act of 1976* (RCRA) TSD units at U Plant,

federal and state regulations pertaining to RCRA TSD units do not apply to materials residing within the U Plant complex until such time as the accumulated materials are physically disturbed (e.g., removed from the facility or treated or repackaged within the facility).

DOE Order 5820.2A, *Radioactive Waste Management*, is used as the applicable standard for radioactive and mixed waste under the provisions of the *Atomic Energy Act of 1955*. Federal standards under the *Clean Air Act of 1955* and *Toxic Substances Control Act of 1976* are the primary standards applicable to the management of asbestos waste and PCBs, respectively.

Regulated waste generated from U Plant S&M activities will include low level radioactive waste, dangerous waste, and mixed waste. Although U Plant is comprised of a number of support facilities, the majority of regulated waste generated during U Plant S&M activities and subject to the requirements of WAC 173-303 (i.e., dangerous and mixed wastes), will be generated from the 221-U Canyon Building. The management of all dangerous waste generated from U Plant complex S&M activities will comply with applicable regulatory requirements of BHI-EE-02, *Environmental Requirements,* and BHI-EE-10, *Waste Management Plan.*

The 221-U Canyon Building provides access to the 'hot cells' previously used for processing highly radioactive material prior to termination of the Plants mission and subsequent facility shutdown. Some of the hot cells contain process vessels that house some residual inventory of process solutions/materials that contain dangerous waste constituents. These vessels and contents will be monitored during U Plant S&M activities. However the generation of dangerous or mixed waste from the contained inventories of these vessels is not anticipated as a result of S&M activities. The 221-U Canyon Building also houses a support shop (maintenance) that generates a small quantity of dangerous wastes (i.e., corrosives, and flammables).

Radioactive constituents are inherent in most of the regulated waste generated from U Plant S&M activities. Radioactive wastes are accumulated and managed in radioactive material areas (RMA) established and controlled in accordance with BHI-SH-02, Volume 1, Procedure 1.19, "Designating and Controlling Radioactive Material Areas (RMA)." Additionally, radioactive wastes that are also regulated as dangerous waste (i.e., mixed waste), per WAC 173-303, are stored in RMAs that also meet the regulatory requirements for satellite accumulation areas (SAA) as provided in WAC 173-303-200 (2) and (3).

The number of RMAs and/or SAAs maintained in U Plant may vary if S&M waste generating processes or locations change. However, the variance should be minimal. As of the date this Plan was developed, the U Plant complex contained five long-term RMAs, of which one RMA also functions as a SAA containing mixed waste. An additional SAA containing dangerous waste is also established and maintained. An example of the U Plant RMA/SAA listing is seen in Table 3-1.

**Table 3-1. Sample Listing of Radiological Material Areas and Satellite Accumulation Areas at the U Plant Facility**

| RMA No. | Description | Indoor/Outdoor | Active (A)/Inactive (I) |
|---|---|---|---|
| IFSM-95-0007 (SAA) | 221-U Operating Gallery | Indoor | A |
| IFSM-95-0009 | 221-U Electrical Gallery | Indoor | A |
| IFSM-95-0010 | 271-U Parking Lot (Connex Box | Indoor | A |
| IFSM-95-0011 | 291-U Stack Laundry Shack | | |
| IFSM-95-0014 | 271-U Burial Boxes next to Connex Box | Outdoor | A |
| IFSM-95-0019 | 271-U 3rd Floor | Indoor | A |
| IFSM-96-0004 | 291-U | Outdoor | A |
| SAA | 221-U Shop | Indoor | A |

U Plant waste identification is accomplished via sampling and analyses and/or through the application of process knowledge. Utilizing the sample analyses and/or process knowledge provided by the Project, waste designation is performed by Field Support Waste Management (FSWM) in accordance with BHI-FS-03, *Field Support Work Instruction*, W002, "Waste Certification."

All Environmental Restoration Contractor (ERC) generated waste, including U Plant S&M waste, is managed per the directives of a site-specific waste management instruction (SSWMI) provided by the Project, as mandated by BHI-EE-10. If the Project requests the assistance of FSWM with the preparation of the SSWMI, the formatting prescribed in BHI-FS-03, W006, "Site Specific Waste Management Instructions," is used for SSWMI development. The SSWMI provides waste stream specific management requirements including designation, separation and segregation, waste minimization, packaging, marking and labeling, storage, inspection, transportation, and tracking and traceability.

Quantities of regulated waste generated annually during U Plant S&M activities will vary with the special circumstances or projects undertaken in any given year that would be considered outside the normal scope of facility S&M. During fiscal year (FY) 1997, U Plant generated approximately 100 cubic feet of low level radioactive S&M waste, 18 cubic feet of dangerous waste, and 90 cubic feet of mixed waste.

The current select disposal facility for low level radioactive waste is the 200 West Area Burial Grounds, operated by the Project Hanford Management Contractor (PHMC). Low level radioactive waste is shipped directly to the 200 West Area Burial Grounds from the U Plant complex.

Dangerous or mixed waste, when accumulated to the point approaching the waste stream-specific quantity limits for SAAs (55-gal. for dangerous waste or one quart for acutely hazardous waste) is transferred to the ERC's less than 90-day accumulation area (e.g., 271-U Storage Facility) for interim storage prior to final transport to the appropriate TSD Facility. Dangerous waste will be transported to an offsite TSD. Mixed waste will be transported to the 200 West Area Central Waste Complex (CWC). The CWC is also operated by the PHMC.

The transportation of all regulated U Plant S&M waste will be facilitated and certified by a FSWM or other Hanford Site authorized shipper.

Detailed information regarding waste management requirements applicable to U Plant S&M activities are presented below.

### 3.1.1 Dangerous/Hazardous Waste Standards

**3.1.1.1 Generator Standards.** Dangerous waste generator standards would apply to any regulated dangerous waste resulting from S&M activities. WAC 173-303-070 requires that a generator determine whether a waste is subject to regulation as a dangerous waste. Sampling and testing methods to be used in making dangerous waste determinations are specified in WAC 173-303-110. 40 CFR 262.11 requires that the generator also determine the status of any RCRA regulated waste with respect to the land disposal restriction (LDR) standards of 40 CFR 268.

Dangerous waste generated by S&M activities at U Plant would most likely be managed in containers. Container management standards are specified in WAC 173-303-630, and include provisions for container integrity, labeling, compatibility, separation and segregation, inspections, and provision of secondary containment. WAC 173-303-160 establishes requirements for determining whether a container may be considered "empty" and therefore exempt from dangerous waste management standards.

Since there are no permitted container storage areas at U Plant, containerized dangerous waste from S&M activities would be subject to the accumulation standards of WAC 173-303-200. With the exception of SAAs, a 90-day accumulation limit is applicable and specified personnel training, preparedness and prevention, contingency planning and emergency preparedness, and general inspection requirements would be imposed. Requirements for SAAs (specified in WAC 173-303-200(2)) are somewhat less stringent. There is no specified time limit for SAAs;

however, quantities are limited to 55 gallons of dangerous waste or one quart of acutely hazardous waste. Generators of RCRA regulated wastes would also be subject to a variety of generator responsibilities established in the LDR regulations of 40 CFR 268.

### 3.1.2 Radioactive Waste Standards

Chapter III of DOE Order 5820.2A establishes a variety of requirements that are applicable to S&M activities at U Plant involving the generation of low-level radioactive or mixed waste. These include the following:

- Per item 3(c)(1) of the Order, technical and administrative controls are required to ensure reduction in the gross volume of waste generated and/or the amount of radioactivity requiring disposal.

- Per 3(c)(2), auditable programs must be in place to assure that the amount of low-level waste generated or shipped for disposal is minimized.

- Per 3(d), low-level waste must be characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal. Characterization must ensure that the actual physical and chemical characteristics and major radionuclides are recorded and known during all phases of waste management. Characterization records must be maintained.

- Per item 3(e)(1), waste generators must ensure that low-level waste shipped to another facility is done in accordance with the receiving facility requirements.

- Per 3(e)(3), generators shall implement a waste certification program to provide assurance that the receiving facility waste acceptance criteria are met.

- Per 3(f)(1), low-level waste must be treated by an appropriate method to ensure disposal can be done in a manner that is protective of public health and safety.

- Per 3(g)(4), each low-level waste package must be labeled to show the type of waste contained.

In addition to these DOE Order requirements pertaining to the generation of low-level waste, Chapter III item 3(k)(2) requires monitoring of non-operational low-level waste treatment, storage, and disposal facilities in order to allow for measure to prevent migration of radionuclides. This requirement is applicable to areas of U Plant where low-level waste exists.

### 3.1.3 Asbestos Standards

The U Plant S&M activities include the cleanup of small amounts of asbestos. Asbestos cleanup activities are done in accordance with 40 CFR 61.150. Per this standard, asbestos cleanup must

be done in a manner that prevents any visible emissions to the outside air. Asbestos-containing waste must be adequately wetted then sealed in leak-tight containers or wrapping. Containers or wrapped materials must be labeled. Disposal at an appropriate waste disposal site must occur as soon as practical.

### 3.1.4 Polychlorinated Biphenyl Standards

Spills or discharges of materials containing greater than 50 parts per million (ppm) of PCB (measured prior to the spill or discharge) are subject to PCB regulations of 40 CFR 761. Specific PCB testing methods are identified in 40 CFR 761.60(g). Regulations at 40 CFR 761.125 establish requirements for PCB spill cleanup. Included are provisions for reporting, cleanup methodology and decontamination requirements, disposal of cleanup debris and materials, and recordkeeping. Cleanup actions must be completed within 48 hours of discovery of the spill for low-concentration spills involving less than 1 pound of PCB. Cleanup actions for high-concentration spills or spills involving more than 1 pound of low-concentration PCBs must be completed within 24 hours. Post-cleanup sampling is required in accordance with 40 CFR 761.130. 40 CFR 761.65(c) establishes standards for temporary storage of PCB cleanup wastes in specified containers for a period of up to 30 days. Containers in temporary storage must be properly dated, inspected, and labeled; PCB storage records must be maintained. After 30 days, the containers must be moved to an approved PCB disposal or storage-for-disposal facility. PCBs are also regulated as dangerous waste (W001) in concentrations between 2 to 50 ppm (WAC 173-303-9904).

## 3.2 ENVIRONMENTAL PROTECTION STANDARDS

In addition to waste management standards described in Section 3.1, environmental protection requirements address releases to air and soil, emergency/contingency planning, and environmental reporting requirements.

Standards for surface water discharges and underground injection of rainwater are not applicable to the U Plant facility because all drains have been plugged as part of deactivation. However, the potential exists for external discharge of contaminated rainwater through cracks and joints in the floor. Because the piping systems were drained as part of transition, significant quantities of liquids are not likely to remain. Therefore, any spills are expected to be fully contained within the building. A variety of release reporting requirements may apply if a release to the environment were to occur. In addition to spill and release reporting requirements, routine reporting requirements apply to S&M activities at U Plant.

Standards contained in WAC 246-247 are applicable to airborne radionuclide emissions from U Plant. In addition, a best management practices inspection standard for differential air pressures for HEPA filters has been established.

Detailed information regarding environmental protection requirements applicable to U Plant S&M activities are presented below.

### 3.2.1 Air Emission Standards

In accordance with 40 CFR 61, Subpart H, and WAC 246-247, radionuclide airborne emissions from all combined operations at the Hanford site may not exceed 10 mrem/yr effective dose equivalent to the hypothetical offsite maximally exposed individual. WAC 246-247 requires verification of compliance, typically through periodic confirmatory air sampling.

One exhaust stack at U Plant (stack 291-U-1) is subject to confirmatory radionuclide emissions monitoring required by WAC 246-247-075. Per agreement with the EPA, sampling of the stack is required four weeks per year, one week per quarter, for gross alpha and gross beta. (See memo, J. E. Rasmussen (RL) to A. W. Conklin (DOH), "National Emission Standards for Hazardous Air Pollutants Federal Facility Compliance Agreement: Periodic Confirmatory Measurement Protocol," dated January 12, 1996 [DOE-RL 1996b].) Sampling records must be kept.

Per WAC 246-247-075, training records must be kept demonstrating that appropriate supervisors and workers are adequately trained in the use and maintenance of emission control and monitoring systems, as well as in the performance of associated test and emergency response procedures. To demonstrate compliance with "as low as reasonably achievable control technology" requirements of WAC 246-247, U Plant exhaust system maintenance and calibration records must also be maintained.

Two additional requirements are imposed on the U Plant exhaust system as best management practices. First, in accordance with guidance provided in the *Nuclear Air Cleaning Handbook*, dp drops across HEPA filters are monitored, with filter changeout required when the pressure drop across the filter exceeds 5-in water gauge. Second, flow rate measurements of the U Plant exhaust system are required on an annual basis.

In addition to the noted application to the on-going exhaust systems, radionuclide emission standards would apply to S&M activities undertaken at U Plant if such activities could result in fugitive, diffuse, or point-source air emissions of radionuclides. If the potential exists for any non-zero radioactive emissions, "best available radionuclide control technology" would be required pursuant to WAC 246-247. If S&M activities could result in an increase of nonradioactive toxic air pollutants to the atmosphere above the small quantity emission rates, implementation of "best available control technology for toxics" would be required in accordance with WAC 173-460.

## 3.3 REPORTING STANDARDS

### 3.3.1 Reporting Requirements for Nonroutine Releases or Abnormal Conditions

**3.3.1.1 Federal Hazardous Substance.** 40 CFR 302 requires immediate notification to the National Response Center upon discovery of a release of a hazardous substance into the environment in excess of a reportable quantity.

40 CFR 355 requires immediate notification to the community emergency coordinator for the local emergency planning committee and to the State emergency response commission for a release of a reportable quantity of an extremely hazardous substance or a *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* hazardous substance.

**3.3.1.2 Dangerous Waste/State Hazardous Substance.** WAC 173-303-145 requires immediate notification for any release of a dangerous waste or a state hazardous substance such that human health or the environment is threatened, regardless of the quantity. Notifications must be made to the Washington State Department of Ecology (Ecology) as well as to local authorities in accordance with the local emergency plan.

WAC 173-303-360 requires immediate notification to Ecology in the event of a release, fire, or explosion at a dangerous waste TSD facility or from a less-than-90-day accumulation area if the event represents an emergency that could threaten human health or the environment. In addition, immediate notification to local authorities is required if the facility emergency coordinator determines that evacuation of local areas may be advisable. A written report on any incident that requires implementation of the facility contingency plan must be submitted to Ecology within 15 days in accordance with WAC 173-303-360(2)(k).

**3.3.1.3 Air Emission System Failure.** WAC 246-247-080(5) requires notification to the DOH within 24 hours of any shutdown, or of any transient abnormal condition lasting more than four hours, or other change in facility operations which, if allowed to persist, would result in emissions of radionuclides in excess of applicable standards. If requested by DOH, a written report must be submitted within 10 days.

**3.3.1.4 Polychlorinated Biphenyl Spills.** 40 CFR 761.125 requires notification in the shortest time possible after discovery (but no later than 24 hours) to the Pesticides and Toxics Substances Branch of the EPA regional office for PCB spills in excess of 10 pounds.

### 3.3.2 Reporting Requirements for Routine Releases

**3.3.2.1 Dangerous Waste Reports.** WAC 173-303-220 requires an annual report from generators of dangerous waste. This provision would apply to any S&M activities undertaken at U Plant resulting in the generation of a dangerous waste.
The Tri-Party Agreement (Ecology, et al. 1996) requires an annual report pertaining to any land

disposal restricted mixed waste generated, treated, stored, or disposed at Hanford. U Plant S&M activities involving LDR mixed waste would need to be included in this report.

The PHMC coordinates preparation and compiles the dangerous waste reports. The U Plant S&M program will need to provide applicable information to the PHMC to support development of these reports.

**3.3.2.2 Air Emissions Report.** WAC 246-247-080 requires an annual air emissions report containing information pertaining to the U Plant exhaust stack.

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# 4.0 RADIOLOGICAL CONTROLS

Radiological conditions for facilities within Surveillance/Maintenance and Transition Projects have been assessed to ensure adequate radiological controls have been implemented to perform S&M activities safely. The radiological control activities implemented for the facilities to demonstrate compliance with DOE Order 5480.1, *Radiation Protection for Occupational Workers*. are described in the following:

- 10 CFR 835, *Occupational Radiation Protection; Final Rule*
- HSRCM-1 *Hanford Site Radiological Control Manual*,
- BHI-SH-01, *ERC Environmental Safety and Health Program*, Section 10.2, "Radiological Controls,"
- BHI-SH-02, Volume 1, *General Procedures*,
- BHI-SH-02, Volume 2, *Safety and Health Procedures*, and
- BHI-SH-04, *Radiological Control Work Instructions.*

Prior to the performance of surveillance or maintenance activities, the proposed activity is discussed with the Radiological Controls organization to determine the scope of the activity and radiological survey requirements needed. Technical assessment documentation may be issued by the Radiological Control organization to provide direction concerning the isotopes of concern, any specific survey and/or air sampling requirements. Additionally, dependent upon work scope and expected radiological conditions, an as low as reasonably achievable (ALARA) review may be performed. Radiological Control Technicians (RCT) assess radiological conditions of the work/surveillance area in accordance with BHI procedures and issued technical assessments, document survey results, and ensure correct radiological postings/boundaries of the area.

Based upon the results of the radiological survey, a radiation work permit (RWP) is issued describing the appropriate personnel protective clothing, dosimeter requirements, respiratory protection and RCT coverage requirements.

Current conditions for some specific areas are outlined below. If conditions change, the appropriate radiological controls and postings will be implemented in accordance with approved BHI procedures. The U Plant Facility contains a variety of radiological areas. The areas include the following:

- Radiological Buffer Areas (RBA),
- Fixed Contamination Areas (FCA),
- Contamination Areas (CA),
- High Contamination Areas (HCA),
- Radiation Areas (RA),
- High Radiation Areas (HRA), and
- Airborne Radioactivity Areas (ARA).

The areas of the building most frequently entered for S&M activities consist of FCAs, RBAs, and CAs. These areas are surveyed and controlled in accordance with BHI procedures and the Radiation Protection Program.

The canyon area of the U Plant Facility is posted an ARA, HCA, and HRA. Entry into this area requires at a minimum a RWP, Level 1 ALARA review, technical assessments for air sampling and survey requirements, a HRA Access Plan, and a current survey of the area. Efforts are in progress to reduce the area posted as a HRA and controls will be modified as appropriate to meet program requirements.

# 5.0 QUALITY ASSURANCE

The ERC Quality Program as documented in BHI-QA-01, *ERC Quality Program,* satisfies the requirements of both DOE Order 5700.6C, *Quality Assurance*, and 10 CFR 830.120, "Quality Assurance Requirements." For the S&M of the U Plant Facility, BHI-QA-01 is augmented by WHC-EP-0536-3, *Quality Assurance Program Plan for Radionuclide Airborne Emissions Monitoring* (WHC 1995), and BHI-QA-03, *ERC Quality Assurance Program Plans,* Plan No. 3.2, "Quality Assurance Program Plan for the Surveillance and Maintenance of Nuclear Facilities."

## 5.1 TRAINING AND QUALIFICATION

Training requirements for ERC personnel performing and/or supporting activities in nuclear facilities are documented in the "Training Implementation Matrix for ERC Managed Nuclear Facilities" (BHI 1998b). The Training Implementation Matrix for ERC Managed Nuclear Facilities, Appendix 2, "U-PLANT," contains the training requirements specific to U Plant.

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# 6.0 HEALTH AND SAFETY/EMERGENCY PREPAREDNESS

## 6.1 HAZARDS

Hazard analyses are conducted for S&M activities in accordance with work control process. The team examines available facility data and proposed activities and processes for hazards, and develops controls for hazards that may pose a threat to workers, the public, and the environment. BHI-SH-02, Procedure 1.7, "Project Safety Planning and Documentation," in concert with BHI-FS-01, Procedure 2.1, "Work Control," ensures that the appropriate level of safety documentation is implemented for all S&M work activities.

## 6.2 EMERGENCY PREPAREDNESS

Administration (preparedness and planning) of the emergency management program for the 221-U (U Plant) Facility is found in BHI-SH-03, *Emergency Management Program*, Volume 2, Section 3.0, "Emergency Action Plan 200 Area S/M&T." BHI-SH-03 meets the requirements of DOE/RL-94-02, *Hanford Emergency Response Plan* (DOE-RL 1996a), and the applicable emergency management DOE Orders and state and federal regulations.

If an emergency occurs at the U Plant Facility, the response to mitigate would not be part of the S&M, rather would fall under the ERC Emergency Management Program as outlined in BHI-SH-03, which implements the applicable DOE Emergency Implementing Procedures.

The following documents the Emergency Management measures taken at the U Plant Facility during S&M.

### 6.2.1 Emergency Preparedness (Training of Personnel)

The U Plant Facility is locked and unoccupied. S&M personnel make entries into the building/canyon during monthly routine and quarterly surveillances. Therefore, no permanent emergency equipment, communications equipment, warning systems, personal protective equipment, spill control, and containment supplies are located within the building.

Prior to routine and quarterly entries, personnel will review the appropriate procedures and attend pre-job safety meetings. The procedures, emergency plan, and meetings dictate the appropriate emergency equipment to be taken into the work area(s) and will identify the facility specific hazards and the appropriate evacuation routes and notifications if an incident occurs.

### 6.2.2 Emergency Planning (Development of the Emergency Action Plan)

Emergency Plan (emergency action plan [BHI-SH-03, Volume 2, Section 3.0) has been written to ensure proper response(s) of employees if an emergency occurs. Facility-specific hazards have been outlined in BHI-00066, *Hanford Surplus Facilities Hazards Identification Document* (Egge 1997) and/or 0221U-SSHS-G0001, "U Plant and $UO_3$ Site Specific Health and Safety Plan (200 West Area) (BHI 1998c). Primary and Alternate Building Emergency Directors (BED), and appropriate evacuation routes are included in the emergency plan. The emergency plan for U Plant is an Emergency Evacuation Information Board posted just inside the 271-U entrance for employees to review prior to conducting S&M.

### 6.2.3 Emergency Response (Evacuation)

If an emergency or abnormal incident occurs during S&M activities, personnel will evacuate the facility and communicate the abnormal condition information to the Patrol Operations Center on 911 (if using a cellular phone, 373-3800), their supervisor, and the BED.

### 6.2.4 Emergency Prevention

Performance of post-deactivation S&M activities and personnel training mitigates contamination migration and/or minimizes the potential for unplanned sudden radiological or hazardous releases.

### 6.2.5 Incident Response

The initial response to any emergency is to immediately protect the health and safety of individuals in the immediate area and to initiate a request for emergency response.

# 7.0 HAZARDOUS SUBSTANCE INVENTORY, MANAGEMENT, AND PROTECTION

The following hazardous substances will be managed in accordance with ALARA considerations and applicable requirements provided in section 3.0 above. Compliance with hazardous material protection requirements are ensured as described in BHI-SH-01, BHI-SH-02, Volumes 1 and 4, and BHI-SH-05, *Industrial Hygiene Work Instructions*.

A summary of the known radiological inventory data is presented in Table 7-1. A list of canyon equipment and possible former process chemicals is provided in Table 7-2. Transient chemicals are also kept in the canyon.

Table 7-1 shows the known radiological inventory data for U Plant. The table also shows the source of the data and provides remarks concerning the data. The actual total inventories associated with U Plant are not defined because of the unknown loading on the 291-U sand filter, unknown contamination on equipment from other facilities, and limited data on contamination remaining in the process cells from former process activities.

Occupied structures in the immediate vicinity of U Plant include the 275-UR Building and mobile trailers to the southwest of the 221-U Building. Adjacent to the 275-UR Building is 2714-U, an unoccupied storage structure and adjacent pad. The 2714-U structure contains eleven 55-gal drums, and the storage pad holds storage and shipping containers (T hoppers) not currently managed by the ERC. These containers contain a total of 667,000 kg of enriched uranium (greater than 1% uranium-235), that was removed from $UO_3$ Plant. The 55-gal drums, also removed from the $UO_3$ Plant, contain 1,445 kg of enriched uranium. Two underground tanks, 241-UX-302A and 241-UX-134, located on the southeast side of 221-U Building, are the responsibility of the Tank Waste Remediation System. Extending along the entire southeast side of the 221-U is an unplanned release site, UPR-200-W-162, which is covered by several feet of clean overburden. An underground vault, 241-WR, used to transfer liquid waste to and from U Plant and the REDOX Complex, is located to the northeast of the 221-U Building.

## Table 7-1. U Plant Radiological Inventory Data (Kerr 1998) (Sheet 1 of 2)

| | Inventory | Source Document | Remarks |
|---|---|---|---|
| 221-U Building | 10,015 Ci beta | SD-DD-FL-001 (RHO 1982 [page 151])<br>WHC-SP-0331 (Kiser 1988 [page A-196]), and<br>WHC-SD-DD-SA-001 (Baxter 1990 [page 4]) | The basis for this value is unknown. |
| 221-U Building | Radiologically controlled and isolated facility | BHI-00066 (Egge 1997 [page 9-1])<br>0221U-SSHS-G001 (BHI 1998c) | Qualitative statement only. |
| 221-U Building | Very little TRU waste in U Plant | WHC-EP-0787 (WHC 1994 [page 4-22]) | Qualitative statement with the following reasoning: the plutonium and other fission products that entered the U Plant remained in solution and were passed through the system and back into underground storage tanks. The concentration of plutonium in the liquid waste entering U Plant would have been minimal because most would have been removed by the bismuth-phosphate process at other plants prior to storage in the underground tanks. The plutonium content of the uranium waste processed in the U Plant was about 2 to 4 g per ton of uranium. In addition, stored equipment from PUREX is a potential source of TRU material in U Plant, including plutonium and thorium. |
| 221-U Building | 800 Ci of fission products<br>15 Ci of uranium | D0105ER0003 (RHO 1980c [page 5]) | Preliminary characterization for decontamination and decommissioning of U Plant. |
| 221-U Building | 200 Ci $^{90}Sr$<br>200 Ci $^{137}Cs$<br>15 Ci plutonium<br>15 Ci $^{238}U$<br>800 Ci total beta | D0105FL0003 (RHO 1980a [page 236]) | Dose rate in cells is generally 100 mR/hr with the exception of the cells containing stored equipment. |
| 221-U Building | 9,000 Ci $^{137}Cs$<br>1,000 Ci $^{90}Sr$ | WHC-SD-DD-PD-001 (Brehm 1991 [page 4]) | U Plant is a "low hazard" facility (old hazard classification terminology). |
| 221-U Building | Less than one-third of a minimum critical mass | CSC-U-149-00010 (Doto 1986 [page 1])<br>RHO-CD-457 (RHO 1980b [page 15-1]) | Criticality designation for U Plant along with a list of "controls" for an isolated facility. Qualitative assessment for the purposes of conducting a criticality safety evaluation. |

Sr – strontium
Cs – cesium
U – uranium
Pu – plutonium
PUREX – Plutonium Uranium Extraction (Plant)
TRU - transuranic

## Table 7-1. U Plant Radiological Inventory Data. (Kerr 1998) (Sheet 2 of 2)

| | Inventory | Source Document | Remarks |
|---|---|---|---|
| Bounding Inventory for 221-U Building | 10,015 Ci $^{90}Sr$<br>15 Ci $^{239}Pu$ | | This bounding inventory was chosen for 221-U Building to be used in the hazard and accident analysis. This inventory was obtained by taking the largest value of total beta activity from any single reference above. Due to uncertainties in the composition of the beta activity, the beta activity was assumed to be entirely due to $^{90}Sr$. Similarly, the largest value for alpha activity from the entries above was assumed to be 100% $^{239}Pu$. |
| 291-U Sand Filter | 787 Ci $^{90}Sr$<br>6,821 Ci $^{137}Cs$<br>41 Ci $^{239}Pu$ | 0200W-CA-N0010 BHI 1998a [page 6]) | Estimated inventory based on stack emission data and assumed sand filter efficiency of 99.95%. All alpha contamination was assumed to be $^{239}Pu$ as a worst-case scenario. |
| 211-U Tank Farm | <20 Ci of beta and <1 Ci of plutonium | D0105FL0001 (RHO 1978 [page 127]) | Surface contamination. |
| 211-U and 211-UA Tank Farms | <20 Ci of uranium and <1 Ci of fission products | D0105ER0003 (RHO 1980c [Page 12]) | Present as surface contamination. |
| 276-U Solvent Handling Facility | 11 Ci beta | D0105FL0001 (RHO 1978 [page 12]) | Present as surface contamination. |
| 276-U Solvent Handling Facility | 8 Ci of fission products and 1 Ci of uranium | D0105ER0003 (RHO 1980c [page 7]) | Present as surface contamination. |
| 276-U Solvent Handling Facility | 2 Ci $^{90}Sr$<br>2 Ci $^{137}Cs$<br>1 Ci $^{238}U$<br>8 Ci total beta | D0105FL0003 (RHO 1980a [page 250]) | Present as surface contamination. |
| 241-WR Vault | 60 Ci $^{90}Sr$ | Appendix F, Table F-2 | Inventory is present as contaminated solutions in tanks, cell and cell sumps and surface contamination. This inventory is determined to be a conservative representation of the residual contamination in 241-WR Vault based upon best engineering judgment and past process knowledge. |

Sr – strontium
Cs – cesium
U – uranium
Pu – plutonium

## Table 7-2. U Plant Canyon Equipment List.[a] (Sheet 1 of 4)

| Cell | Function | Equipment in Cell | Equipment on Deck | Potential Chemical Hazards (WHC-EP-0787 [WHC 1994]) |
|---|---|---|---|---|
| 1 (1L) | Storage | Empty | One wheelbarrow<br>One obsolete crane maintenance platform ladder | — |
| 2 (1R) | Storage | REDOX vessels D-13, H-4 coil | One cell cover block<br>One 10-ton power hook for canyon crane (discard)<br>One grabber tool for canyon crane | Hexone |
| 3 (2L) | Access to railroad tunnel | Unknown | | — |
| 4 (2R) | Storage | Fuel storage rack (0.4 by 3.0 by 4.3) | One working platform for railcar waste tanker<br>One decon sink<br>35 ft of miscellaneous piping | — |
| 5 (3L) | Storage | B Plant centrifuges (3)<br>Pair of fuel canisters (19) | One working platform for railcar waste tanker<br>One obsolete centrifuge from T-Plant<br>Two 3-in. by 10-ft flex waste tanker decon piping<br>One instrument dip tube from waste | — |
| 6 (3R) | Feed receiving | U Plant tank (2.7 by 2.7) | Manlift working platform with miscellaneous fittings, flanges and piping from waste tanker work at U Plant<br>Two B Plant hot pipe wrench milling saws<br>Eight 6-in. by 6-in. by 6-ft timbers | $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, UNH |
| 7 (4L) | Storage | PUREX Equipment:<br>Pumps (3)<br><br>B Plant Equipment:<br>Pumps (2)<br>Agitators (4) | Clear | — |
| 8 (4R) | Cell drainage | Waste tank 4-6 | One Hanford-type shipping cask (lid is stored on deck at cell 12)<br>One man basket<br>One 4-point lifting yoke 4 ft by 9 ft by 4 ft<br>One electrical jumper for old 7-1 tank<br>One 25.5-ft by 8-in. I-beam | — |
| 9 (5L) | Cell drainage | Waste tanks 5-1 and 5-2 | 35-1 repaired B Plant tank | — |
| 10 (5R) | Cell drainage | Active waste handling tank 5-6 | Three 5-ft by 3.5-ft decon tank<br>Yoke for handling Stanray cask lid | — |
| 11 (6L) | Waste evaporation and concentration | Evaporator dunnage from U Plant<br>U Plant tank 6-4<br>B Plant F-22 filter | Yoke storage area<br>One jumper assembly, H-2-46384<br>One 7-1 tank electrical jumper<br>Three Stanray cask loading yokes<br>One 3-ft by 12-ft divider for burial | $HNO_3$, $H_3PO_4$, UNH |
| 12 (6R) | Storage | PUREX pot dissolver<br>B Plant centrifuge | One lid for Hanford-type cask, 100-N<br>One M-130 cask unloading shield<br>One A-3 PUREX dissolver shipping cradle (save for PUREX)<br>One 9-ft by 6-ft REDOX tank<br>Three Hanford slug buckets (two filled with lead bricks) | Zr heel, Hg |

REDOX – Reduction Oxidation Plant
PUREX – Plutonium Uranium Extraction Plant

[a] This table is not the official tracking mechanism by which equipment status and location are tracked. The information provided may not be updated as equipment status is changed (e.g., moved). The purpose of the table is to provide an indication of the type of equipment present and the level of knowledge maintained by U Plant.

## Table 7-2. U Plant Canyon Equipment List.[a] (Sheet 2 of 4)

| Cell | Function | Equipment in Cell | Equipment on Deck | Potential Chemical Hazards (WHC-EP-0787 [WHC 1994]) |
|---|---|---|---|---|
| 13 (7L) | Waste evaporation and concentration | Evaporator<br>Concentrator cooler<br>Feed stripping tower<br>Concentrator seal pot<br>Concentrator condenser | Old U Plant condenser (not modified for B Plant) | $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, UNH |
| 14 (7R) | Storage, waste concentration | Agitators (6)<br>Pumps (8)<br>U Plant tank | One storage rack for pumps and agitators for B Plant.<br>Majority of these pumps removed from U Plant but never modified for B Plant. Run-in station in cell | — |
| 15 (8L) | Waste evaporation and concentrator | Evaporator<br>Concentrator cooler<br>Feed stripping tower<br>Concentrator seal pot<br>Concentrator condenser | One PUREX F-14 tank (decontaminated and repaired)<br>One cell cover block<br>One storage rack for GE waste liner<br>One PUREX tube bundle shipping capsule (used with multi-purpose transfer box) | $AI(NOC_3)_3$, $HNO_3$, TBP, UNH |
| 16 (8R) | Storage, waste concentration | B Plant tank<br>PUREX thorium jumpers (17)<br>Concentrator feed receiver | One REDOX tube bundle capsule<br>One open 9-ft by 9-ft decon tank<br>One PUREX condenser assembly old bolted flange type<br>One jumper assembly, J-J6-F-J7G (61867)<br>One unidentified jet jumper assembly (belongs to REDOX or PUREX)<br>One obsolete agitator, no motor<br>Two obsolete pump columns | — |
| 17 (9L) | Waste evaporation and concentration | Evaporator<br>Concentrator cooler<br>Waste concentration tower<br>Concentrator seal pot<br>Concentrator condenser | Clear | $NH_4OH$, $Fe(OH)_3$, NaCI, $Na2U_2O7$, $NaNO_3$, $Na_3PO_4$, $Na_2SO_4$, TBP |
| 18 (9R) | Storage | PUREX F-8 tank | One 7-ft by 6-ft by 12-ft metal waste box, full waste, at one time used for jumper transport to tank farms, not approved as a shipping or burial container<br>One waste skiff full of miscellaneous waste material<br>One B Plant 9-ft by 9-ft tank for storage | — |
| 19 (10L) | Waste evaporation and concentration | Evaporator<br>Concentrator cooler<br>Waste concentration tower<br>Concentrator seal pot<br>Concentrator condenser | One old Shippingport fuel storage rack<br>B Plant 13-1 tank, 9 ft by 9 ft, storage<br>One REDOX pot dissolver<br>One 10-ft by 3-ft by 4-ft portable tool cabinet<br>Six 100-N fuel shipping cask divider | $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, UNH |
| 20 (10R) | Waste concentration | Concentrator for feed tank<br>Concentrator feed receiver | REDOX pot tower<br>U Plant 8-ft by 14-ft tank spacer assembly for scrap shipping cask<br>One 3-ft by 3-ft by 2-ft lifting yoke (for burial) | $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, UNH |
| 21 (11L) | Waste sampling | Waste sampler tank | One concentrator lifting yoke<br>One jumper assembly #56-386<br>Three U Plant cell jumpers<br>Five exhaust ventilator assemblies removed from the roof at 224-T. Contaminated with low level plutonium. Need containers for burial<br>One obsolete B Plant dissolver<br>One portable Lincoln welder | $NH_2SO_3H$, $Fe(NH_4)_2(SO_4)_2$, FeCN, $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, TBP, UNH |

REDOX – Reduction Oxidation Plant
PUREX – Plutonium Uranium Extraction Plant

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## Table 7-2. U Plant Canyon Equipment List. (Sheet 3 of 4)

| Cell | Function | Equipment in Cell | Equipment on Deck | Potential Chemical Hazards (WHC-EP-0787 [WHC 1994]) |
|---|---|---|---|---|
| 22 (11R) | Waste neutralization | Neutralizer tank | One open top decon tank 6 ft by 14 ft<br>One PUREX dissolver catch tank/yoke<br>One B Plant SP-5 tank, 5 ft by 7 ft (stored as a B Plant spare) | $NH_4OH$, $Fe(OH)_3$, $NiSO_4$, NaCI, $Na_2U_2O_7$, NaOH, $NaNO_3$, $Na_3PO_4$, TBP, $Na_2SO_4$ |
| 23 (12L) | Waste sampling | Waste sampler tank | One REDOX pot dissolver | $NH_2SO_3H$, $Fe(NH_4)_2(SO_4)_2$, FeCN, $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, TBP, UNH |
| 24 (12R) | Waste sampling | U Plant tank (2.4 by 4.3)<br>U Plant pump<br>PUREX crane toolbox | One PUREX F-5 condenser (decontaminated but needs to be leak tested)<br>One REDOX centrifuge "A" frame<br>One PUREX centrifuge G-G3-S0 (cleaned but needs repair)<br>One U Plant concentrator column | $NH_2SO_3H$, $Fe(NH_4)_2(SO_4)_2$, FeCN, $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, TBP, UNH |
| 25 (13L) | Waste sampling | Waste sampler tank | One REDOX silo leaded viewing glass window | $NH_2SO_3H$, $Fe(NH_4)_2(SO_4)_2$, FeCN, $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, TBP, UNH |
| 26 (13R) | Aqueous effluent, spent solvent stream receiving | Receiver tank | Nine original U Plant pumps and agitators (motors and baseplates removed from some units)<br>One REDOX F-2 pot | $NH_2SO_3H$, $Fe(NH_4)_2(SO_4)_2$, FeCN, $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, TBP, UNH |
| 27 (14L) | Feed preparation | Centrifuge catch tank | Shipping capsule for pumps and agitators, for use with multi-purpose tanks<br>Two Hanford-type shipping casks, for use in 100 Area well cars<br>One U Plant "philly" gear agitator (no motor)<br>Five lifting bails for U Plant pumps and agitators<br>Lifting yoke for scrap cask<br>Unidentified agitator (no motor) | $AI(NO_3)_3$, $HNO_3$, TBP, UNH |
| 28 (14R) | Feed preparation | Centrifuge catch tank | Two cell cover blocks<br>One 9-ft tall "A" frame | $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, UNH |
| 29 (15L) | Storage | B Plant ti-tube bundles (2) | Damaged pump shipping stand, bury<br>40-ft wide cell storage rack<br>Three Hanford-type shipping casks, for 100 Area type well cars<br>One PUREX off-gas heater EA-2 (to be repaired) | — |
| 30 (15R) | Storage | REDOX pots (2)<br>REDOX towers (2) | One B Plant 31-1 tank, stored<br>PUREX centrifuge 2-G-G-3, repairs completed<br>One T Plant centrifuge "A" frame with tank and bowl assembly in place (for burial)<br>One cell cover block | Cr, sulfamate, hexone |
| 31 (16L) | Storage | B Plant centrifuges<br>REDOX tube bundles (2) | Two cell cover blocks<br>One 6-ft by 3.5-ft tank coil made in error for a B Plant tank<br>U Plant pump column, no motor or baseplate<br>E-20-3 B Plant condenser (decontaminated may need to be modified)<br>One 8-ft by 14-ft B Plant tank (save this)<br>One PUREX H-4 condenser (decontaminated and repaired) | — |

REDOX – Reduction Oxidation Plant
PUREX – Plutonium Uranium Extraction Plant

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## Table 7-2. U Plant Canyon Equipment List. (Sheet 4 of 4)

| Cell | Function | Equipment in Cell | Equipment on Deck | Potential Chemical Hazards (WHC-EP-0787) |
|---|---|---|---|---|
| 32 (16R) | Aqueous effluent receiving | Tank (2.7 by 2.7) | Two 100-N fuel shipping casks, for one well shipments<br>Two halves of old pump and agitator shipping container (save this)<br>One fuel storage rack, used with scrap cask shipments<br>One PUREX centrifuge 2-G-E2 (SS764 has been repaired) | $HNO_3$, TBP, UNH |
| 33 (17L) | Spent solvent stream receiving, stripping, and aqueous effluent processing | Spent fuel stream receiver tank<br>Stripper column<br>Aqueous effluent pump-out tank | Four Hanford shipping casks, for 100-N Area type III well cars<br>Two old T-Plant centrifuges "A" frame with tank and bowl | DEOBASE[a], $HNO_3$, TBP, UNH |
| 34 (17R) | Waste receiving and treatment | Uranium-containing stream feed tank<br>Aqueous effluent receiver tank<br>Decontamination column | One B Plant centrifuge "A" frame<br>One PUREX J-8 condenser (decontaminated)<br>One PUREX pulser, #10, 1-PG-G2 (decontaminated and repaired)<br>One PUREX off-gas jumper (doughnut) (decontaminated and repaired)<br>Seven various size HAPO shipping casks (stored for B Plant) | $NH_2SO_3H$, $Fe(NH_4)_2(SO_4)_2$, $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaHSO_4$, TBP, UNH |
| 35 (18L) | Waste receiving and treatment | RIOW receiver tank<br>RIO column<br>RI00 receiver tanks | One B Plant 9-ft by 9-ft tank for storage | DEOBASE, $HNO_3$, $H_3PO_4$, $Na_2SO_4$, $H_2SO_4$, TBP, UN, UNH |
| 36 (18R) | Hydrocarbon dilutant feed | U Plant tank (2.1 by 4.3) | Three cell cover blocks | TBP, DEOBASE |
| 37 (19L) | Spent solvent stream receiving, stripping, and aqueous effluent processing | Stripping column<br>Pump-out and receiving tanks | Two cell cover blocks | DEOBASE, $HNO_3$, TBP, UNH |
| 38 (19R) | Waste receiving and treatment | Uranium-containing stream feed tank<br>Aqueous effluent receiver tank<br>Decontamination column | Two cell cover blocks | $NH_2SO_3$[4], $Fe(NH_4)_2$, $HNO_3$, $H_3PO_4$, $NaNO_3$, $NaSHO_4$, TBP, UNH |
| 39 (20L) | RIIOO and RIIOW receiving, RIIO processing | RIIOW receiver tank<br>RI00 column<br>RI00 receiver tank | One cell cover block | DEOBASE, $HNO_3$, $H_3PO_4$, $Na_2SO_4$, $H_2SO_4$, TBP, UN, UNH |
| 40 (20R) | Feed receiving | Hydrocarbon dilutant feed tank | Clear | TBP, DEOBASE |

REDOX – Reduction Oxidation Plant
PUREX – Plutonium Uranium Extraction Plant

[a] This table is not the official tracking mechanism by which equipment status and location are tracked. The information provided may not be updated as equipment status is changed (e.g., moved). The purpose of the table is to provide an indication of the type of equipment present and the level of knowledge maintained by U Plant.

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# 8.0 SAFEGUARDS AND SECURITY

Currently, the U Plant Facility is classified as a Hazard Category 3 nuclear facility. A letter requesting writing off the remaining Special Nuclear Material inventory as normal operating loss has been approved by RL (BHI 1995). Section 6.0 contains a summary of the remaining residual radionuclides remaining at the U Plant Facility. If during S&M of the U Plant Facility, any item or container found that might be suspected to contain special nuclear material, notification shall be made to BHI management as appropriate.

During S&M the U Plant Facility and most of the ancillaries are unoccupied, locked, and/or sealed. A chain link perimeter fence deters physical access. Entry into the U Plant Facility fenced areas and buildings is limited to authorized personnel with proper training. Signs are posted accordingly throughout the facility identifying restricted access. The facility is entered only for S&M activities. Access control for U Plant and other surplus facilities is described in BHI-FS-01, *Field Support Administration*, Section 1.1, "Access Control and Administration for ERC Facilities."

There are no intrusion alarms or routine security patrols within the perimeter fence of the U Plant Facility. Hanford Patrol continues to provide routine security patrols in the vicinity as art of their patrols throughout the 200 West Area.

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# 9.0 COST AND SCHEDULE

The following is the estimated annual costs for S&M of the 221-U Facility.

| | |
|---|---|
| Quarterly surveillance | $180K |
| Maintenance | 900K |

Activities described in Section 2.3 are scheduled throughout the year in accordance with the applicable FY detailed work plan and the field support work package system described in BHI-FS-01.

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## 10. REFERENCES

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BHI-FS-03, *Field Support Waste Management Instructions*, Bechtel Hanford, Inc., Richland, Washington.

BHI-FS-04, *Field Support Operating Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-QA-01, *ERC Quality Program*, Bechtel Hanford, Inc., Richland, Washington.

BHI-QA-03, *ERC Quality Assurance Program Plan*, Bechtel Hanford, Inc., Richland, Washington.

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